

1963 ANNUAL REPORT

ARCTIC-YUKON-KUSKOKWIM AREA

ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES

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## INTRODUCTION

This report summarizes fisheries management and research activities carried out in 1963 in the Arctic-Yukon-Kuskokwim Area. Figure 1 is a map of the area and Table 1 presents the total salmon catch by district for the area.

This report is almost totally concerned with salmon fisheries. Salmon comprise nearly all the commercial catch in this area and also the bulk of the subsistence catch. There are, however, commercially harvestable stocks of other fish--whitefish, herring, sheefish, and char. To date, these species have been harvested only to a very limited degree mainly due to transportation and marketing difficulties. Because of this, funds have been allocated to research and management of already existing fisheries, salmon, and very little work has been done on these other species. There is some data available, especially on species found concurrently with salmon, and this data is available upon request.



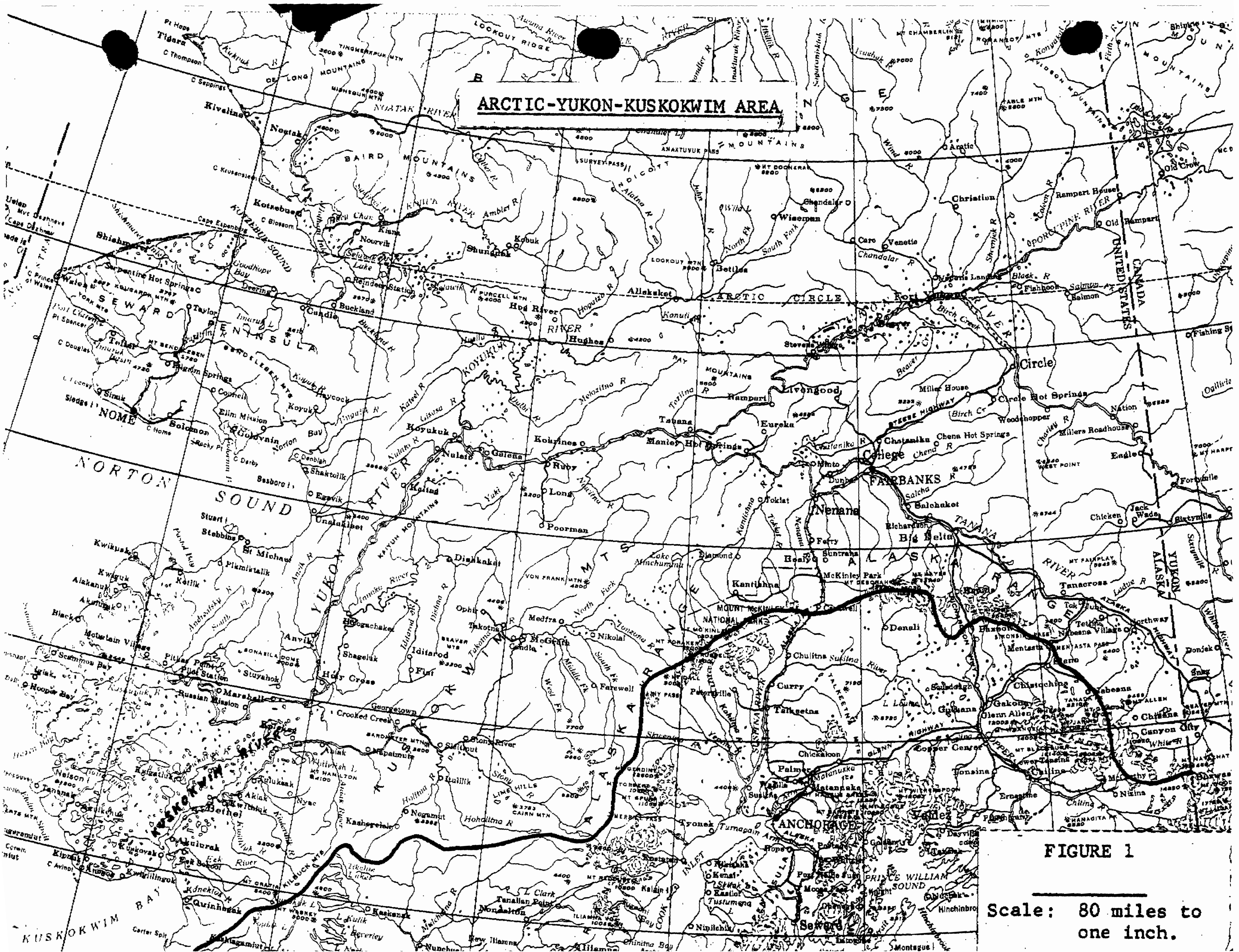


TABLE 1

ARCTIC-YUKON-KUSKOKWIM  
TOTAL SALMON CATCH BY DISTRICT, 1963

	Kings	Reds	Silvers	Pinks	Chums
KUSKOKWIM:					
Commercial	12,016	0	15,660	0	0
Subsistence	<u>34,615</u>	<u>0</u>	<u>          </u>	<u>          </u>	<u>140,890</u> <sup>1/</sup>
SUB-TOTAL	46,631	0	15,660	0	140,890
KANEKTOK:					
Commercial	6,555	0	0	0	0
YUKON:					
Commercial	116,994	0	5,572	0	0
Subsistence	<u>32,656</u>	<u>          </u>	<u>12,098</u>	<u>1,146</u>	<u>408,381</u>
SUB-TOTAL	149,650	0	17,670	1,146	408,381
NORTON SOUND:					
Commercial	6,613	38	16,765	55,895	154,789
KOTZEBUE:					
Commercial	7	0	0	136	54,445
Subsistence	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>31,069</u>
SUB-TOTAL	7	0	0	136	85,514
GRAND TOTAL FOR A-Y-K AREA <sup>2/</sup>					
1963	209,456	38	50,095	57,177	789,574
1962	156,413	29,767	46,232	38,215	1,013,987

<sup>1/</sup> Chums and reds combined.

<sup>2/</sup> In 1962 and 1963, subsistence catches were not documented in the Norton Sound district or the Kanektok sub-district.



## YUKON DISTRICT

### INTRODUCTION

Whitefish, sheefish, burbot, lampreys, pike, and miscellaneous other fish species are taken for food, barter, or sale in the Yukon drainage. However, salmon comprise the backbone of the commercial and subsistence fisheries on the Yukon River. Chum, king, silver, pink, and red salmon in order of abundance are present in the Yukon. The subsistence fishery is primarily dependent on chum salmon for human and dog food. King salmon are the basis for the commercial fishery in the Yukon and also contribute to the subsistence fishery where they are usually stripped or at least cut, dried and smoked for human food. Silvers enter both the commercial and subsistence fisheries in minor numbers, partially because this run enters the Yukon quite late in the season. Pinks and reds are present in such negligible numbers that for all practical purposes, they do not enter the subsistence or commercial catch statistics.

### COMMERCIAL FISHERY--KING SALMON

General: The king salmon are the first salmon to enter the Yukon after break up every spring. They appear at the mouth of the river around June 1 and the majority of the run has usually passed upriver by July 4, although stragglers are still in evidence in August.

This run has been commercially fished sporadically since 1918. Since 1961, the fishery on kings in the Yukon has been managed by the use of openings and closures in fishing time to secure escapement. This fishery is restricted to the area between the mouth of the Yukon and Owl Slough near the village of Marshall about 150 miles above the mouth. Above this point, limited quotas on the commercial taking of king salmon are in effect--3,000 kings between Marshall



and the mouth of the Koyukuk River and 2,000 kings in the remainder of the drainage.

In 1963, commercial fishing for king salmon was allowed from 6:00 a.m. Monday to 6:00 a.m. Wednesday and from 6:00 p.m. Thursday to 6:00 p.m. Saturday of each week in sub-district #1 (mouth to Anuk River, see Figure 2). In sub-district #2 (Anuk River to Owl Slough), fishing was allowed from 6:00 p.m. Sunday to 6:00 p.m. Tuesday and from 6:00 a.m. Thursday to 6:00 a.m. Saturday of each week. the season opened June 1 and closed 6:00 a.m. July 3 in sub-district #1 and 6:00 p.m. July 2 in sub-district #2. Fishing was done with both set and drift gill nets.

Breakup was normal in 1963. The river was clear of ice by May 29 and while the water remained high throughout the season, it was not unusually so. One serious mishap concerned with breakup did affect the fishery. The river had undercut the bank at Kwiguk over a period of years, and on May 27, the Northern Commercial Company cannery, second largest on the river, was lost.

Comparative catch and effort statistics are shown in Table 2 for the years 1960, 1961, 1962, and 1963. Prior to 1961, the commercial catch in the Yukon River was limited by quota. With the removal of the quota (65,000 kings for the whole river) in 1961, there was a considerable increase in effort (see Table 2) over 1960. Part of this increase was due to the inception of a fishery in the Holy Cross area (Y-3). Since 1961, king salmon have been flown by charter aircraft from the quota area to Aniak and thence by commercial aircraft to Anchorage for canning. However, most of the increase was due to new fishermen and operators attracted to the area by the elimination of the quota. In 1961, two new operators entered the lower Yukon fishery. Due to adverse conditions at the mouth (low water and a lack of knowledge of the channels) the new freezer ship and floating mild cure outfit were late in reaching the fishing grounds and did not participate

TABLE 2

YUKON RIVER KING SALMON COMMERCIAL FISHERY  
COMPARATIVE CATCH STATISTICS  
1960, 1961, 1962, AND 1963

	Year	Y-1	Y-2	Y-3	Total	Y-4*
Total Boat Hours	1960	36,192	33,048	Not in Existence	69,240	
	1961	67,548	23,172	2,808	93,528	
	1962	68,736	29,016	2,520	100,272	
	1963	59,742	21,096	5,616	86,454	
Catch	1960	50,713	15,994	Not in Existence	66,707	834
	1961	84,406	29,028	4,965	118,399	1,394
	1962	67,072	22,224	4,687	93,983	724
	1963	85,004	24,211	6,976	116,191	803
Catch Per Boat Hour	1960	1.4	0.5	-	1.0	
	1961	1.2	1.3	1.8	1.3	
	1962	1.0	0.8	1.9	0.9	
	1963	1.4	1.1	1.2	1.3	
<u>Licenses</u>						
Commercial	1961	238	130	26	394	13
	1962	321	143	46	515	13
	1963	285	131	30	446	5
Vessel (Tenders)	1961	210 (15)	112 (3)	18	340	10
	1962	320 (20)	127 (3)	31	478	12
	1963	272 (17)	113 (5)	22	407	6
<u>Gear</u>						
Drift (Number Fathoms)	1961	17 ( 925)	86 (5,130)	-	6,055 F	0
	1962	55 (3,200)	98 (6,750)	24 (1,730)	11,680 F	0
	1963	24 (1,225)	85 (6,585)	5 ( 400)	8,210 F	0
Set (Number Fathoms)	1961	217 (25,560)	101 (6,050)	19 ( 691)	32,301 F	1 ( 50)
	1962	303 (35,470)	117 (6,465)	14 ( 900)	42,835 F	2 (100)
	1963	259 (30,975)	101 (5,445)	21 (1,350)	37,770 F	2 ( 90)

\* Effort data in Y-4 is not accurate enough for analysis of the catch in this district.

significantly in the catch.

In 1962, there was a further increase in effort, once again, mostly due to new operations and fishermen. There were two freezerships and a mild cure barge operating at the mouth. These operators recruited some fishermen from the already existing operations, but most of their fishermen were inexperienced men brought in from the coast (Scammon and Hooper Bay) and from upriver areas. This brings me to one of the most significant features of the 1963 fishery. In 1962, new operators did not do well for several reasons:

1. The existing operations and fishermen are capable of adequately harvesting the run and therefore competition for the fish is fairly keen.
2. It takes specialized knowledge to successfully fish in a large river and on the average, inexperienced fishermen will not do well.
3. Shifting bars, changing water conditions and ice make entry into the mouth of the Yukon a difficult obstacle when time is critical. A lay after breakup means lost fishing time.
4. Transportation and supply facilities are nearly non-existent this north, and an operator must be self-sufficient, which requires experience.

These problems are reflected in the 1963 statistics. Only one "new" outfit--the floating mild cure barge returned (see Table 44, List of Operators). For the first time in four years, the effort has reduced rather than increased. Actually, the number of boat hours fished was reduced to a pre-1961 level. Partially, this was due to regulation. In 1961, fishing was allowed until June 6 in sub-district #1 as compared to June 2 in 1963. However, the number of vessels fishing was much reduced and the actual effort available was less than that of 1962 and more than in 1961. It is possible that the fishing effort is beginning to stabilize. This would certainly be desirable economically since

managing agency feels that no increase in the catch should be allowed and the present average earning per year per boat is only around \$1,000.00.

Run Analysis: It is known that the king run in the Yukon is made up of separate runs or races bound to the widely separated major spawning areas of the Yukon drainage. However, it has not been possible to separate these races in the fishery or assess their relative magnitude. This year for the first time, a concerted effort was made by tagging, analysis of commercial catch, and analysis of subsistence catches to follow peaks in the king run through the fishery and up-river to the various parts of the drainage.

In 1963 for the first time, it was possible to separate the catches within each sub-district into smaller statistical areas (shown in Figure 2). This was done in an attempt to follow the progress of the run as it entered and proceeded through the 270 mile long fishery. It was possible by this method to separate catches made in the south, middle, and north mouths to obtain timing of the peaks through the fishery, and partially analyze escapement.

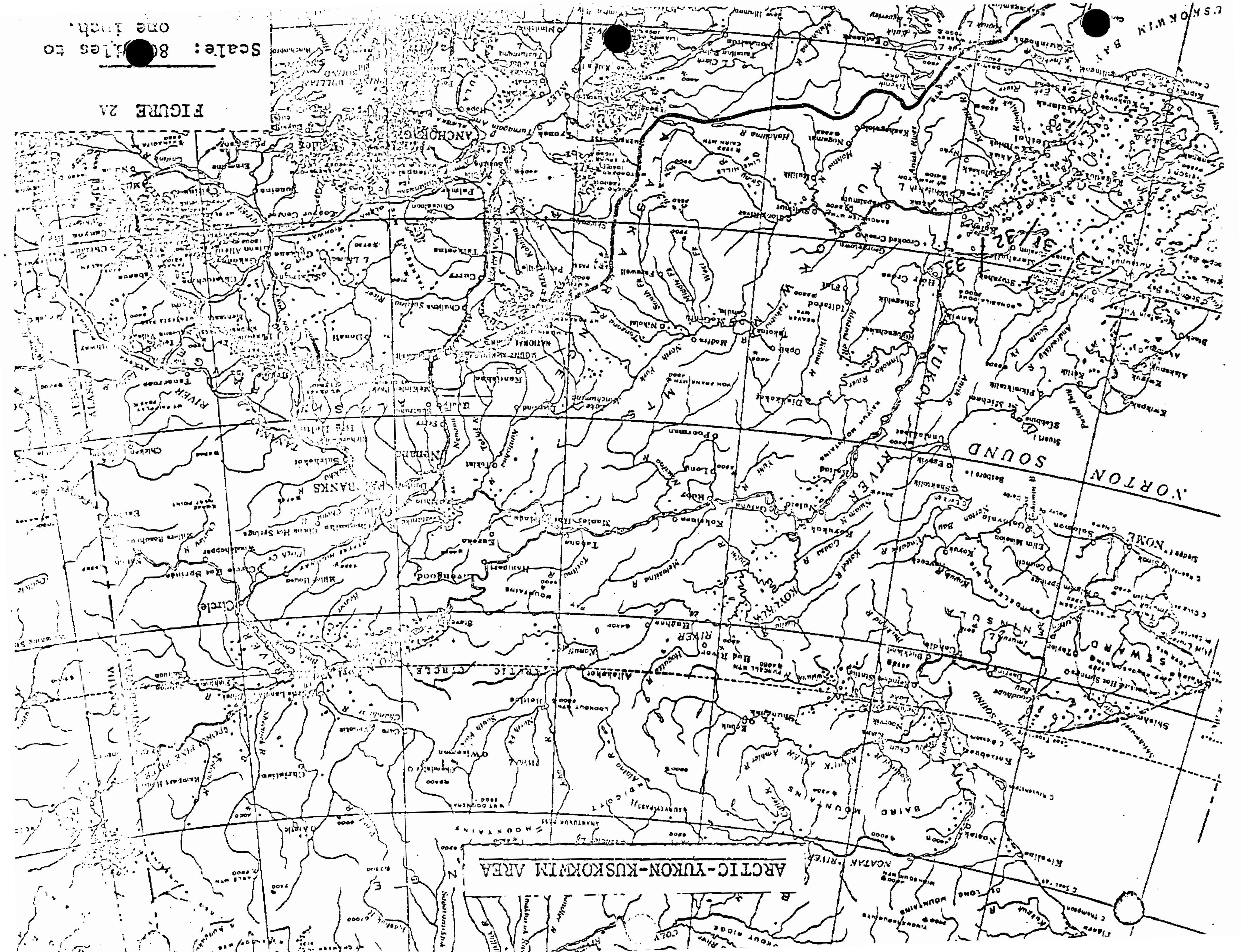
Tables 5 through 9 give pertinent catch and effort data by day and area for sub-districts #1, #2, and #3 and various sub-divisions within these districts.

There is no good data on migration routes through the ocean to the Yukon. At least a portion of the migration is from south to north along the coast. This is borne out by king salmon catches at Hooper Bay and Black River. When the run or this portion of the run reaches the mouth of the south mouth, they may either enter there, or if they have difficulty due to low tides, strong currents, etc., a portion of the run may proceed on to the other mouths. In this case, they would hit Black River, the south mouth, Alakanuk mouth, Kwiguk mouth, Bugomowik mouth, middle mouth, and north mouth in that order. This, of course, would mean that there was no racial difference in the run to the various mouths, merely a timing difference due to some fish taking longer to enter the



Scale: 80 Miles to one inch.

FIGURE 2A



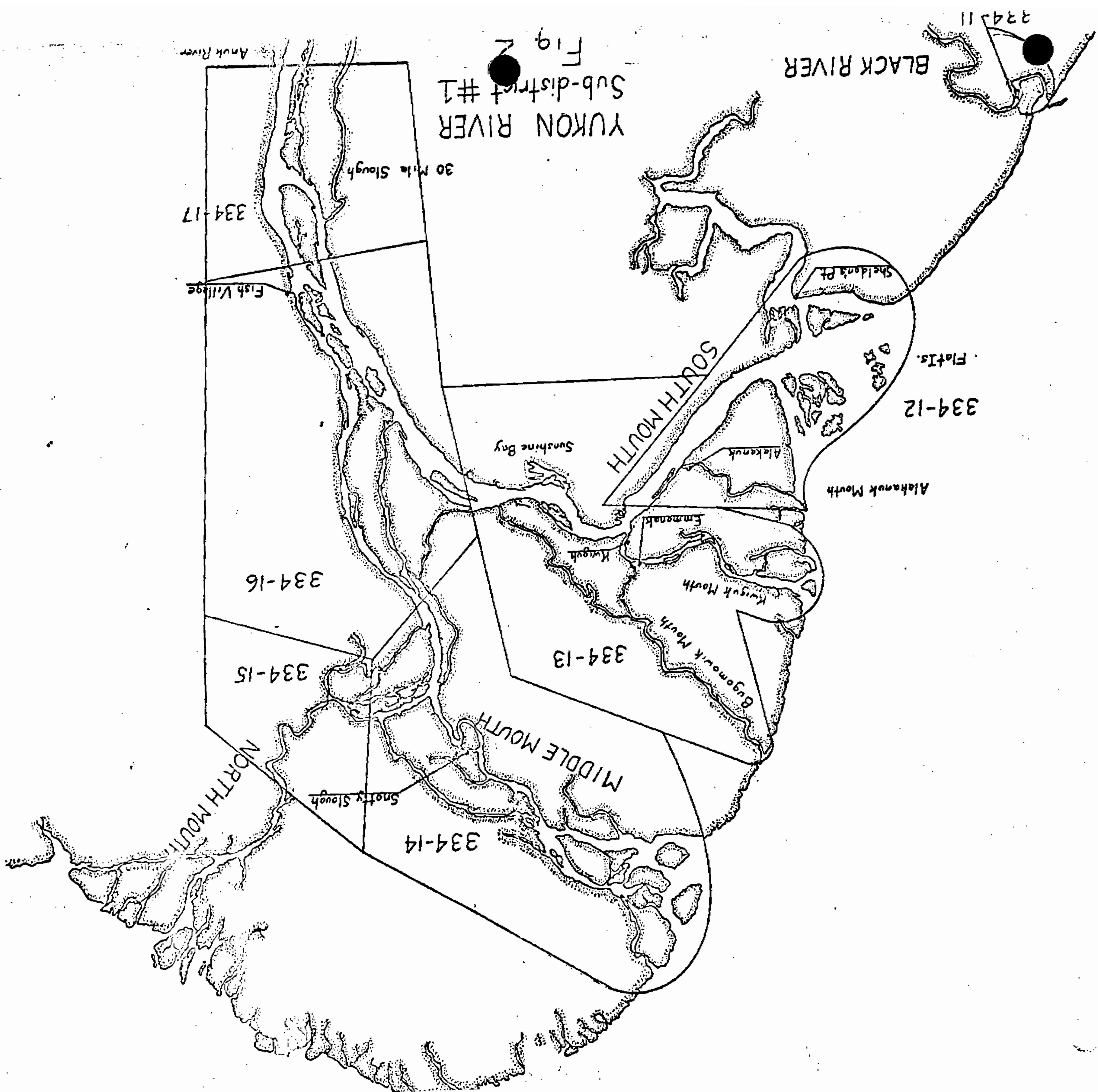


TABLE 4

YUKON RIVER COMMERCIAL KING SALMON FISHERY, 1963  
SUB-DISTRICT #1, DRIFT NET CATCH

Date	Hours Fished	Total Boat Hours	Catch	Catch Per Boat Per Hour	Cumulative Catch
June 7	24	288	87	.30	87
8	18	198	56	.28	143
9					
10	18	180	578	3.21	721
11	24	408	529	1.30	1,250
12	6	54	249	4.61	1,499
13	6				
14	24	630	1,537	2.44	3,036
15	18	414	1,069	2.58	4,105
16					
17	18	360	1,803	5.01	5,908
18	24	240	1,081	4.50	6,989
19	6	114	462	4.05	7,451
20	6				
21	24	240	262	1.09	7,713
22	18	306	257	.84	7,970
23					
24	18	198	891	4.50	8,861
25	24	144	949	6.59	9,810
26	6	42	196	4.67	10,016
27	6				
28	24	120	214	1.78	10,220
29	18	90	205	2.28	10,425



TABLE 5

1953 YUKON RIVER KING SALMON FISHERY  
CATCH BY STATISTICAL AREA  
334-12 (SOUTH MOUTH)

Date	Boats	Hours	Boat Hours	Total	Fish	Total Fish	Period Index
June 3	7	18	126		10		
4	39	24	936		224		
5	42	6	252		397		
				1,314		631	0.5
6	-	6			-		
7	53	24	1,590		610		
8	63	18	1,134		1,300		
				2,724		1,910	0.7
10	41	18	738		332		
11	68	24	1,632		1,110		
12	71	6	426		2,628		
				2,796		4,070	1.5
13	3	6	18		16		
14	60	24	1,440		611		
15	73	18	1,314		1,373		
				2,772		2,000	0.7
17	59	18	1,062		1,311		
18	77	24	1,848		1,689		
19	76	6	456		1,356		
				3,366		4,356	1.3
20	2	6	12		9		
21	69	24	1,656		664		
22	56	18	1,008		276		
				2,676		949	0.4
24	58	18	1,044		1,478		
25	76	24	1,824		1,511		
26	20	6	120		78		
				2,988		3,067	1.0
27	3	6	18		49		
28	72	24	1,728		2,195		
29	73	18	1,314		1,378		
				3,060		3,622	1.2
July 1	20	18	360		186		
2	15	24	360		93		
3	11	6	66		114		
				786		393	0.5
TOTAL CATCH:						20,998	



TABLE 6

1963 YUKON RIVER KING SALMON FISHERY  
CATCH BY STATISTICAL AREA  
334-14 (MIDDLE MOUTH)

Date	Boats	Hours	Boat Hours	Total	Fish	Total Fish	Period Index
**							
June 6	3	6	18		7		
7	20	24	480		55		
8	33	18	594		243		
				1,092		305	0.3
10	24	18	432		238		
11	35	24	840		1,096		
12	22	6	132		711		
				1,404		2,045	1.5
13	6	6	36		86		
14	33	24	792		591		
15	45	18	810		5,058		
				1,638		5,735	3.5
17	44	18	792		1,216		
18	21	24	504		608		
19	42	6	252		845		
				1,548		2,669	1.7
20	6	6	36		46		
21	29	24	696		478		
22	63	18	1,134		1,169		
				1,866		1,693	0.9
24	25	18	450		776		
25	33	24	792		883		
26	36	6	216		774		
				1,458		2,433	1.7
27	15	6	90		314		
28	32	24	768		638		
29	56	18	1,008		743		
				1,866		1,695	0.9
July 1	21	18	378		228		
2	21	24	504		83		
3	20	6	120		118		
				1,002		429	0.4
TOTAL CATCH						17,010	
**							
June 3							
4	1	24	24		1		
5	2	6	12		5		
				36		6	0.2

TABLE 7

1963 YUKON RIVER KING SALMON FISHERY  
CATCH BY STATISTICAL AREA  
334-15 (NORTH MOUTH)

Date	Boats	Hours	Boat Hours	Total	Fish	Total Fish	Period Index
June 6		6					
7	2	24	60		8		
8	7	18	126		24		
				186		32	0.2
10	4	18	72		9		
11	7	24	168		37		
12	6	6	36		19		
				276		65	0.2
13		6					
14	8	24	240		205		
15	8	18	144		366		
				384		571	1.5
17	5	18	90		243		
18	8	24	192		264		
19	8	6	48		181		
				330		688	2.1
20		6					
21	8	24	240		221		
22	8	18	144		175		
				384		396	1.0
24	8	18	144		160		
25	8	24	192		557		
26	8	6	48		333		
				384		1,050	2.7
27	3	6	18		140		
28	5	24	120		260		
29	8	18	144		394		
				282		794	2.8
July 1	6	18	108		76		
2							
3							
				108		<u>76</u>	0.7

TOTAL CATCH:

3,672

TABLE 3  
YUKON RIVER COMMERCIAL FISHERY  
CATCH STATISTICS, 1963  
SUB-DISTRICT #2, ALL GEAR COMBINED

Date	Hours	Boats	Catch	Cummulative Catch
June 6	18			
7	24			
8	6	12	107	107
9	6			
10	24	56	323	430
11	18	86	1,094	1,524
12				
13	18	36	203	1,727
14	24	97	1,558	3,285
15	6	73	1,281	4,566
16	6	18	129	4,695
17	24	73	1,674	6,369
18	18	126	4,915	11,284
19				
20	18	45	906	12,190
21	24	56	1,128	13,318
22	6	61	951	14,269
23	6	20	284	14,553
24	24	46	920	15,473
25	18	110	4,716	20,189
26				
27	18	34	906	21,095
28	24	14	393	21,488
29	6	21	503	21,991
30	6	14	437	22,428
July 1	24	55	802	23,230
2	18	47	981	24,211

TABLE 9

YUKON RIVER COMMERCIAL FISHERY  
CATCH STATISTICS, 1963  
SUB-DISTRICT #3, ALL GEAR COMBINED

Date	Hours	Boats	Catch	Cumulative Catch
June 9	24			
10	24			
11	24	6	60	60
12	24			
13	24	4	26	86
14	24	13	137	223
15	24	19	317	540
16	24	16	242	782
17	24	26	637	1,419
18	24	23	476	1,895
19	24	15	363	2,258
20	24	28	1,028	3,286
21	24	10	193	3,479
22	24	15	853	4,332
23	24	1	82	4,414
24	24	12	782	5,196
25	24	29	1,715	6,911
26	24	6	65	6,976
27	24			
28	24			
29	24			



Yukon because of their proceeding farther north before entering. This does not mean that there are not racial differences in the run, just that they cannot be separated on the basis of the point of entry. There is also a possibility that a portion of the run comes in directly from the ocean without migrating up the coast. Kings are taken for subsistence at Stebbins, north of the mouth of the Yukon, and commercially at Unalakleet. From the size, color, and oil content of some of the kings, it is suspected that they may be Yukon fish.

If the run does not proceed up the coast, there is at least a strong correlation between the runs entering the various mouths of the Yukon. With our present statistical area breakdown, we cannot completely separate catches to the Alakanuk, Kwiguk, and Bugomowik mouths from the south mouth run. However, the middle and north mouths are easily separated. The middle mouth is about 40-50 miles farther north on the coast than the south mouth. The north mouth is an additional 40-50 miles along the coast.

Referring to Table 5, we can see that the first peak of the run entered the south mouth on June 12. The first peak of the run in the middle mouth occurred on June 14, and in the north mouth on June 18. The first peak in the middle mouth catches, therefore, occurred about two days later than the first peak in the south mouth. The first peak in the north mouth occurred about three to four days later than the middle mouth.

The progress of this run upriver can be generally followed, although due to closures and contributions from so many different mouths, the picture is somewhat obscured. Following the run in one mouth at a time through sub-district #1, certain features may be seen. The run first peaked in the south mouth on about June 12. Apparently this peak was not large enough to be predominant in 334-13. It undoubtedly was a major contributor to the high catch shown on June 13-15, but indications are that the major peak in 334-13 came at the end of this period--probably from fish entering the Kwiguk and Bugomowik mouths. The run in

334-12, therefore, may not have been as strong as it normally is. For some reason listed before, the normal number of salmon may have bypassed this mouth to enter the others.

The first peak of the run took about three days to traverse sub-district #1, about one day to pass between the sub-districts, about two and one-half days through sub-district #2, and three days through sub-district #3. This part of the run, then spent a total of about nine and one-half days in the fishery and six and one-half in sub-districts #1 and #2. On the other hand, the run entering the middle mouth spent about one day less in the fishery. This means that these fish migrated up the river at about 28 miles per day.

Most of these statistical areas show a definite bimodal distribution in catch. There were apparently two main peaks in the run through the fishery. In addition, there was a late peak in the south mouth on June 26-29 that came in too late to affect the catches in the other areas because they had already ceased fishing.

The second main peak in the run seems to have entered 334-12 between June 22 at 6:00 p.m. and June 24 at 6:00 a.m.; it occurs in 334-13 perhaps one day later, and 334-14 about one day later. It would appear that the major portion of this run came through the south, Alakanuk, Kwiguk, and Bugomowik mouths, although the north mouth realized a very good catch per unit effort from this run about three to four days after it entered the south mouth--on June 26 and 27. As near as can be determined, this peak took about two days to traverse sub-district #1 from the south mouth.

The second peak took about 12 hours to significantly affect the catch per unit effort in 334-21, and about three more days to traverse all of sub-district #2. It does not appear in sub-district #3 catches due to the early closure, so the last record we have of it is on June 28-29 in 334-24.

The timing of these peaks in the south mouth fishery is borne out by the catches of our tagging site crew shown in Table 16. The tagging nets fished seven days per week.

Commercial Fishery Analysis: The Yukon king salmon commercial fishery in 1963 was on the average a successful one for fisherman and operator alike. The overall catch per unit effort was approximately equal to 1961. Fishing success in sub-district #1 was greater than in 1961 primarily because the fishermen were spread throughout more of the sub-district and were able to intercept the runs at more points along their migration route. The catch success in sub-district #2 was correspondingly less, but still much better than during the quota days.

Part of the decrease in total average catch per unit of effort in sub-district #2 was due to the fact that from June 23 to June 29, a period covering the second major peak in the run, the fishing effort (boat hours) was reduced. The operators in sub-district #2 had such good success in the first part of the season that two of them shut down during part of this period. Much of the remaining effort was expended in the middle and upper portions of sub-district #2, areas that characteristically do not experience a high rate of fishing success.

Escapement is very difficult to evaluate on the basis of the commercial catch statistics. The majority of the fishing effort is in sub-district #1. After having been exposed to this gear, the catch per unit effort was higher in the upper end of sub-district #1 and the lower end of sub-district #2 than anywhere else in the commercial fishery. Catches in sub-district #3 were also comparable to catches in downriver sections, although this district did not fish the second peak in the run.

In 1963, the weekly closures were split to two 1 1/2 day periods. The effect of this compared to the previous three day per week straight closure is

hard to evaluate. On the average, it probably increased the catch in sub-district #1 and therefore also caused a decrease in sub-district #2. It apparently was effective in giving some protection to all portions of the run, since the basic characteristics of the run as it entered the mouth were preserved throughout the fishery. Under the straight four day per week fishing period, tremendous peaks were created by the openings and closures, and it was possible that some of the run was overharvested while other parts were underharvested.

A comparison of the ~~straight~~ 4 day week with the 5 1/2 day week under the quota system is possible. Under the quota, sub-district #2 never realized an average catch per boat hour of over 0.7. This was primarily due to the effort in sub-district #2 fishing for over 4/5 of the season with no appreciable success. In 1960, the catch per unit effort was very poor prior to June 23. Sixty-two per cent (62%) of the 15,995 king salmon catch in sub-district #2 was made after June 22. Sub-district #1 closed on June 21--there is a definite correlation between the closure in sub-district #1 and the tremendous increase in fishing success in sub-district #2 two days later. In other words, the gear in sub-district #1 was harvesting enough of the run on a 5 1/2 day per week basis to completely depress fishing success in sub-district #2. The staggered closures, while increasing the catch, have eliminated this effect. Effort has been taken off the first part of the run and shifted later in the season. A comparison of 1960 and 1963 catches is given in Table 10. As can be seen, in 1963 only 3,000 more kings were taken in sub-district #1 up to June 21 despite the increase in effort. The catches in sub-district #2 are much increased by the same date although the effort has decreased. Therefore, the closures in the fishery are having the desirable effect to obtain an escapement from all portions of the run. This, of course, would not be important unless there are separate races in the run. This is borne out, I believe, by the distinct character of the two



TABLE 10

YUKON RIVER COMMERCIAL KING SALMON FISHERY  
COMPARATIVE CATCH STATISTICS  
1960 AND 1963

	Year	Y-1	Y-2
Total Boat Hours	1960	36,192	33,048
	1963	85,104	24,131
Total Catch	1960	50,713	15,994
	1963	85,104	24,131
Catch Per Boat Hour	1960	1.4	0.5
	1963	1.4	1.1
Catch Through June 21 (Y-1 closure, 1960)	1960	50,713	5,018
	1963	53,732	13,318
Catch Through June 25 (Y-2 closure, 1960)	1960		15,994
	1963		20,189

TABLE 11

YUKON RIVER COMMERCIAL FISHERY, AUGUST SEASON CATCH STATISTICS  
SUB-DISTRICT #1, SET NET GEAR, 1963

Date	Hours Fished	Boats	Total Boat Hours	Silver Salmon Catch	Catch Per Boat Hour
August 9	24	2	48	119	2.5
10	18	2	36	31	0.9
11		Closed to commercial fishing.			
12	18	2	36	19	0.5
13	24	2	48	47	1.0
14	6	2	12	50	4.2
15	6				
16	24	5	150	311	2.1
17	18	2	36	31	0.9
18		Closed to commercial fishing.			
19	18	3	54	62	1.1
20	24	4	96	78	0.8
21	6	2	12	24	2.0
23	30	3	90	249	2.8
24	18	1	18	13	0.7
25	24	1	24	17	0.7
26	24	3	72	158	2.2
27	24	2	48	211	4.4
28	24	2	48	100	2.1
29	24	4	96	138	1.4
30	24	4	96	280	2.9
31	24	43	1,032	3,564	3.5
September 1	24				
2	24				
3	24	No fishing.			
4	24				
5	24				
6	24	2	48	70	1.5
TOTALS:			2,100	5,572	2.7

main peaks in the run traveling through the commercial fishery and by subsistence catch data given later.

One conclusion reached from this analysis is that the fishery in sub-district #3 must be regulated or eliminated. It appears that the closures in sub-district #1 and #2 are offering adequate protection to the first part of the run. However, when this run reaches sub-district #3, it is fished for seven days per week and up to 7,000 king salmon. Closures in the weekly fishing coupled with better enforcement of the 3,000 quota are needed.

#### COMMERCIAL FISHERY--SILVER SALMON

In 1963, only two operators participated in the August fishery. One operator salted silvers and the other froze them for the fresh market in Fairbanks. Neither was interested in chums, so the fall chum run was not fished commercially this year. The freezer barge was anchored at Alakanuk and the salting operation was at Emmonak.

This fishery opened August 1, but no effort was made until August 9. The weekly fishing period was 6:00 a.m. Monday to 6:00 a.m. Wednesday and 6:00 p.m. Thursday to 6:00 p.m. Saturday. On August 24 because of the negligible fishing effort, the fishery was opened to seven days per week.

Table 11 gives the catch statistics for this fishery. Because of the small amount of fishing effort, it is difficult to evaluate the run; however, from the catch and local comment, it seemed to be fairly large.

#### SUBSISTENCE FISHERY

Survey Methods: The personal use or subsistence fishery of the Yukon drainage has been surveyed annually since 1961. During 1963, as in previous years, two Department of Fish and Game aides in a seventeen foot outboard cruiser counted

all the fish on drying racks and in smokehouses and caches along the survey route. In addition, catch forms on which daily catches could be entered were mailed to fishermen previous to the fishing season. Many fishermen completed and returned these forms to the Anchorage office. All catches made after survey dates turned in on catch forms, were included in the total survey figures. The survey crew on occasions, obtained catches from these forms instead of making a count of dried fish.

The following is a listing of the standard survey methods used by the Department for the last three years:

1. Wherever possible, an actual count of fish on drying racks and in smokehouses was made.
2. The crew asked to see and count all salmon that had already been cached in the form of bundled dried fish. Since the number of salmon per bundle was a fairly constant figure, the number of bundles were counted and then multiplied by the number of fish per bundle to arrive at a total figure.
3. In instances when smoked salmon had already been stored in kegs or barrels, the fishermen were asked how many fish each contained.
4. The numbers of retained salmon used for chinuk were estimated in cases when the fishermen knew the numbers of salmon involved. Numbers of salmon utilized as chinuk were not estimated in the 1962 survey.
5. Some caches and smokehouses still contained year-old salmon. These salmon were much darker in coloration and could be easily distinguished from salmon taken during the current fishing season.
6. The species of salmon were separated on the basis of size, color of flesh and caudal fin spotting. Fishermen usually knew how many king salmon they had taken for subsistence purposes and often their figures

were utilized. A small run of red salmon is present in the Yukon, but no attempt was made to separate reds from chums in the catches.

7. Information such as the number of people, number of dogs, units of fishing gear, etc. was ascertained by personal interview. Other species besides salmon were counted and included: whitefish species (Coregonus spp.), sheefish (Stenodus leucichthys), char (Salvelinus spp.), grayling (Thymallus arcticus), pike (Esox lucius), and burbot (Lota lota).
8. The estimated coverage of each fishing unit or village surveyed by the Department was tabulated. In 1963, the average estimated coverage for the entire survey was 91%. The data for each village was expanded by the estimated percentage of the unit not surveyed. Therefore, the raw data for the entire survey was expanded 9%.
9. Catches made by villages not on the survey route were reported by responsible individuals to whom survey forms were mailed.

Area of Survey: All villages and fish camps from the mouths of the Yukon River to Circle were surveyed. The survey was extended to include three villages on the Tanana River. In addition, catches of the following villages, not on the survey route, were obtained by the use of a catch questionnaire method: Huslia, Hughes, Allakaket, Chalkytsik, Canyon Village, Venetie, and Eagle. Catches from the Canadian portion of the drainage for 1962 and 1963 were supplied by Mr. W. K. Elliott of the Canadian Department of Fisheries.

The 1963 Department survey was conducted over a 76 day period during which time, approximately 1,500 river miles were traveled. During the last three summers, a total of over 6,300 river miles have been traveled by survey crews.

Results: Table 12 shows catches and fishing effort by village for 1963. A total of 32,656 kings, 408,381 chums, 1,146 pinks, and 12,098 cohos totaling

TABLE 12

**SUBSISTENCE CATCH (EXPANDED) BY VILLAGE  
YUKON RIVER DRAINAGE, 1963**

Fishing Unit	Date of Survey	No. of Fishing Families	No. People In Fishing Families	Kings	Chums	Pinks	Cohos	Total Salmon	Units of Gear Fished		
									Chum Net	King Net	Fish- Wheels
Black River	Catch Calendar	5	?	38	1,779	0	0	1,817	Gill Nets		
Sheldons Pt. and Kwikluak Pass	8/6, 8/11	44	241	893	30,168	114	516	31,691	56	3	0
Alakanuk	8/8	48	263	81	17,664	202	87	18,034	59	0	0
Kwiguk-Emmonak	8/3	39	279	120	26,104	68	1,577	27,869	64	2	0
Aproka Pass	7/31	8	38	268	6,080	31	64	6,443	13	4	0
Snotty Slough	7/31	10	44	25	2,641	7	92	2,765	11	0	0
Hamilton-Kotlik	7/30	25	148	195	8,543	24	1,375	10,137	30	1	0
Mountain Village	8/14-8/17	36	227	2,427	8,164	95	1,847	12,533	42	23	1
Pitkas Pt.-St. Marys	8/18, 8/19	36	202	1,254	6,528	152	321	8,255	36	24	0
Pilot Station	8/20, 8/21	36	204	801	4,737	218	598	6,354	37	36	0
Marshall	8/22, 8/23	24	123	2,012	7,290	161	572	10,035	31	26	2
Russian Mission	8/24	16	78	1,392	5,022	39	293	6,746	17	15	1
Holy Cross	8/25, 8/26	37	226	3,123	12,433	10	99	15,655	15	32	12
Anvik	8/27	17	99	163	27,981	25	58	28,227	11	0	7
Shageluk Camp- Holikachuk Camp	8/28	17	95	197	18,358	0	0	18,555	5	0	15
Kaltag	8/29, 8/30	25	163	102	23,088	0	105	23,295	22	0	9
Nulato	8/30-9/1	37	209	835	31,737	0	5	32,577	12	10	12
Koyukuk	9/1	17	101	629	7,901	0	65	8,595	20	17	3
Galena	9/2, 9/3	11	66	282	6,692	0	39	7,013	3	10	4
Ruby-Kokrines	9/3, 9/4	16	93	1,514	15,515	0	70	17,099	3	4	10
Tanana	9/5, 9/6	17	67	1,414	16,196	0	450	18,060	0	5	12
Rampart	10/1	7	36	1,231	11,206	0	3	12,440	0	0	5
Stevens Village	10/4	10	52	1,073	8,236	0	11	9,320	2	4	6
Beaver	10/6	13	66	491	12,004	0	115	12,610	8	3	6
Fort Yukon	10/8, 10/9	23	167	2,831	31,170	0	49	34,050	0	0	26



TABLE 12 (Cont'd)

Fishing Unit	Date of Survey	No. of Fishing Families	No. People in Fishing Families	Kings	Chums	Pinks	Cohos	Total Salmon	Units of Gear Fished		
									Chum Net	King Net	Fish-Wheels
Circle City	10/13	2	13	250	100	0	0	350	0	0	2
Eagle	Catch Calendar	2	?	500	50	0	75	625	Fishwheel		
Dawson	Canadian Dept. of Fisheries	20	?	1,500	1,500	0	0	3,000	Fishwheel and gill nets		
Ross River	"	25	?	600	-	0	0	600	"		
Mayo	"	12	?	250	-	0	0	250	"		
Pelly River-Minto	"	10	?	2,000	1,500	0	0	3,500	"		
Carmacks	"	35	?	2,500	2,500	0	0	5,000	"		
Johnsons Crossing	"	11	?	900	-	0	0	900	Drift Gill Nets		
MAIN YUKON TOTALS:		691	3,300+	31,891	352,887	1,146	8,476	394,400	497+	219+	133+
Huslia	Catch Calendar	7	?	32	5,455	0	0	5,487	King and dog nets		
Hughes	Catch Calendar	2	?	47	767	0	0	814	King and dog nets		
Allakaket	Catch Calendar	9	?	85	1,972	0	0	2,057	Dog net		
KOYUKUK RIVER TOTALS:		18	?	164	8,194	0	0	8,358			
Manley Hot Springs	9/26	1	3	0	2,659	0	306	2,965	0	0	1
Minto	9/26	13	112	325	11,062	0	1,466	12,853	0	0	12
Nenana	9/28	9	58	212	11,749	0	1,850	13,812	0	0	12
TANANA RIVER TOTALS:		28	173	538	25,470	0	3,622	29,630	0	0	25
Venetie	Catch Calendar	1	?	0	200	0	0	200			
Canyon Village	Catch Calendar	5	?	17	1,566	0	0	1,583	Gill nets		
Chalkytsik	Catch Calendar	1	?	2	64	0	0	66	Gill nets		
Old Crow	Canadian Dept. of Fisheries		?	44	20,000	0	0	20,044	Gill nets		
CHANDALAR AND PORCUPINE RIVER TOTALS:		7+	?	63	21,830	0	0	21,893			
YUKON DRAINAGE GRAND TOTAL:		744+	3,473+	32,656	408,381	1,146	12,098	454,281	497+	219+	158+

454,281 salmon were taken. A total of 744 known fishing families were surveyed. A minimum total of 497 chum salmon gill nets (5 1/2 inch mesh), 219 king salmon gill nets (8 1/2 inch mesh) and 158 fishwheels were fished for subsistence purposes in 1963. Table 13 lists the catches of non-salmon species caught by village for 1963.

Catch Comparisons: The 1963 boat survey was conducted an average of 7.0 days and 17.3 days later than in 1962 and 1961 respectively. Because of the later survey dates, the 1963 recorded fall chum and coho salmon catches more nearly represent the actual catches when compared to previous surveys. King, pink, and summer chum salmon catches, as in previous surveys, more nearly represent actual catches as those runs had already passed through the villages at the times of survey. Table 14 presents comparative catches of chums and king by village for 1961, 1962, and 1963.

In this section, subsistence catches will be compared in an attempt to determine relative run sizes and escapements to various sections of the Yukon drainage. It should be pointed out that the use of subsistence catches for this purpose is subject to error. There is no way known to accurately assess the effect of differences in water conditions and fishing effort (other than number of fishermen, units of gear, etc.) on the catches.

Due to differences in utilization of and dependence on fish resources, fishing methods, and topography, the Yukon drainage has been divided into seven (7) districts. This grouping facilitates the making of catch comparisons and in determining various factors that may influence catches. The outstanding characteristics of each district are presented in the Arctic-Yukon-Kuskokwim Annual Report for 1962. Table 12 shows the villages grouped by district; the Roman numerals on the left margin designate districts.

TABLE 13

SUBSISTENCE CATCHES OF NON-SALMON SPECIES BY VILLAGE  
YUKON RIVER DRAINAGE, 1963

Fishing Unit	Whitefish	Sheefish	Other Species <sup>1/</sup>
Sheldons Point and Kwikluak Pass	241	33	6
Alakanuk	6	6	0
Kwiguk-Emmonak	21	22	0
Aproka Pass	56	28	0
Snotty Slough	1	14	0
Hamilton-Kotlik	254	88	0
Mountain Village	611	173	0
Pitkas Point-St. Marys	773	201	0
Pilot Station	1,793	656	0
Marshall	1,715	472	0
Russian Mission	287	220	0
Holy Cross	1,117	411	0
Anvik	1,763	84	0
Shageluk Camp-Holikachuk Camp	6,073	76	0
Kaitag	5,083	368	109
Nulato	11,410	337	41
Koyukuk	1,615	271	60
Galena	1,827	184	15
Ruby-Kokrines	7,713	198	140
Tanana	7,580	1,121	76
Rampart	1,600	270	57
Stevens Village	1,476	49	204
Beaver	2,964	158	640
Fort Yukon	7,081	463	644
Circle City	60	12	43
Manley Hot Springs	600	38	0
Minto	1,579	106	194
Nenana	<u>1,751</u>	<u>70</u>	<u>1,247</u>
<b>TOTALS:</b>	<b>67,050</b>	<b>6,129</b>	<b>3,476</b>

<sup>1/</sup> Char, grayling, burbot, pike.

TABLE 1.4

**SUBSISTENCE CATCH DATA BY VILLAGE  
YUKON RIVER, 1961 - 1963**

Village	1963	k i n g s 1962	1961	1963	C h u m s 1962	1961
<b>Main Yukon:</b>						
Black River	38	-	-	1,779	-	--
Sheldons Point and Kwikluak Pass	893	116	180	30,168	10,899	12,683
Alakanuk	81	53	165	17,664	5,747	8,932
Kwiguk-Emmonak	120	21	137	26,104	9,074	15,670
Aproka Pass	268	180	171	6,080	5,277	7,303
Snotty Slough	25	1	8	2,641	794	1,106
Hamilton-Kotlik	195	35	111	8,543	5,362	3,931
Mountain Village	2,427	619	1,110	8,164	8,331	7,373
Pitkas Point-St. Marys	1,254	391	1,810	6,528	10,510	8,771
Pilot Station	801	219	753	4,737	13,926	5,605
Marshall	2,012	503	1,265	7,290	6,595	5,992
Russian Mission	1,392	641	1,563	5,022	9,994	4,098
Holy Cross	3,123	1,111	2,648	12,433	20,424	21,144
Anvik	163	51	22	27,981	43,404	61,406
Shageluk-Holikachuk	197	37	25	18,358	32,737	56,284
Kaltag	102	224	33	23,088	25,824	23,395
Nulato	835	171	513	31,737	27,948	63,163
Koyukuk	629	423	483	7,901	6,282	13,544
Galena	282	123	626	6,692	1,673	10,585
Ruby-Kokrines	1,514	226	1,060	15,515	18,243	15,654
Tanana	1,414	332	2,379	16,196	7,245	12,775
Rampart	1,231	1,438	605	11,206	6,962	11,722
Stevens Village	1,073	831	650	8,236	4,355	3,490
Beaver	491	442	185	12,004	2,334	2,975
Fort Yukon	2,831	1,822	2,958	31,170	10,255	13,252
Circle City	250	393	496	100	800	992
Eagle	500	400	875	50	100	150
Dawson	1,500	2,000	2,231	1,500	3,000	725
Ross River	600	500	-	0	0	-
Mayo	250	300	-	0	0	-
Pelly River-Minto	2,000	2,000	-	1,500	1,500	-
Carmacks	2,500	3,000	-	2,500	2,000	-
Johnson's Crossing	900	1,000	-	0	0	-
<b>Innoko River:</b>						
Shageluk	-	(Few)	-	-	3,500	-
Holikachuk	-	-	-	-	100	-
<b>Tanana River:</b>						
Minto	325	86	17	11,062	12,455	4,536
Manley Hot Springs	-	6	330	2,659	4,773	1,950
Nenana	213	115	310	11,749	13,821	6,426

TABLE (Cont'd)

Village	K i n g s			C h u m s		
	1963	1962	1961	1963	1962	1961
Other Tributaries:						
Huslia	32	100	-	5,455	16,000	-
Hughes	47	-	-	767	-	-
Allakaket	85	-	-	1,972	(Few)	-
Venetia		(Few)	-	200	1,000	-
Canyon Village	17	0	-	1,566	210	-
Chalkyitsik	2	0	-	64	500	-
Old Crow	44	0	-	20,000	2,800	-
TOTALS:	32,656	19,910	23,719	408,381	356,754	405,632
TOTALS FOR EQUIVALENT AREAS:	26,141	13,010	23,719	372,578	329,144	405,632

Table 15 shows subsistence fishing effort for 1961 to 1963 by district. Figure 3 shows the total numbers of salmon taken and the average catches of kings and chums per fishing family for each district during 1961 to 1963. Table 15 and Figure 3 represent equivalent areas surveyed during the three years; all data is comparable.

The 1963 recorded king salmon catch represents the largest catch since Department surveys were initiated. The average king salmon catch per fishing family surveyed in 1963 was greater than that of the previous two years in every district except District V and VII. In District V, the average catch per fishing family was substantially greater than that of 1962, but slightly less than that of 1961.

In District VII, the 1963 average catch per fishing family was approximately one-half of that for 1961 and 1962. In Table 15 and Figure 3, only the catches of Circle City, Eagle, and Dawson are considered, as Canadian fishing communities above Dawson were not surveyed in 1961. The catch and fishing effort figures are based on estimates submitted by Royal Canadian Mounted Police, priests, prospectors, Indian Affairs Branch personnel, etc. to the Canadian Department of Fisheries. Very few of these figures have been checked for accuracy, and yearly catch comparisons involving this district should be made with caution. In 1962, a total of seven fishing families were reported for Dawson, yet in 1963, a total of 20 fishing families were reported for this same community. This drastically lowered the average catch for this district as only a total of 23 fishing families were recorded for the entire district during 1963. The total king catch for all fishing communities above Dawson was 6,250 in 1963 and 6,800 in 1962.

As previously mentioned, water conditions and fishing effort will affect catches. For example, fishermen may have made a more concentrated effort to utilize kings for subsistence purposes in 1963 as compared to recent years.



TABLE 15

EQUIVALENT SUBSISTENCE FISHING EFFORT BY DISTRICT  
YUKON RIVER, 1963 TO 1961

	District I			District II			District III			District IV		
	1963	1962	1961	1963	1962	1961	1963	1962	1961	1963	1962	1961
No. of Fishing Families	174	170	166	185	156 <sup>1/</sup>	174	96	116	108	61	39	78
Av. No. of People per Family	5.8	5.9	5.8	5.7	5.9	5.8	5.9	5.5	5.7	5.4	6.0	5.2
Units of Fishing Gear:												
Chum Net	233	293	218	178	129	162	50	49	18	26	27	31
King Net	10	2	12	156	80	86	10	3	2	36	20	20
Fishwheel	0	1	1	16	10	16	43	49	44	29	21	39

	District V			District VI			District VII			All Districts		
	1963	1962	1961	1963	1962	1961	1963 <sup>1/</sup>	1962	1961	1963	1962	1961
No. of Fishing Families	28	30	31	53	53	67	24	15	21	621	579	645
Av. No. of People per Family	6.2	6.5	6.0	6.1	5.6	6.6	?	4.7	5.1	5.7	5.8	5.8
Units of Fishing Gear:												
Chum Net	0	0	0	10	10	7	?	11	7	497+	519	448
King Net	0	0	0	7	0	2	?	5	7	219+	110	129
Fishwheel	25	22	28	43	35	41	2+	10	13	158+	148	182

<sup>1/</sup> Estimated only, no actual count.

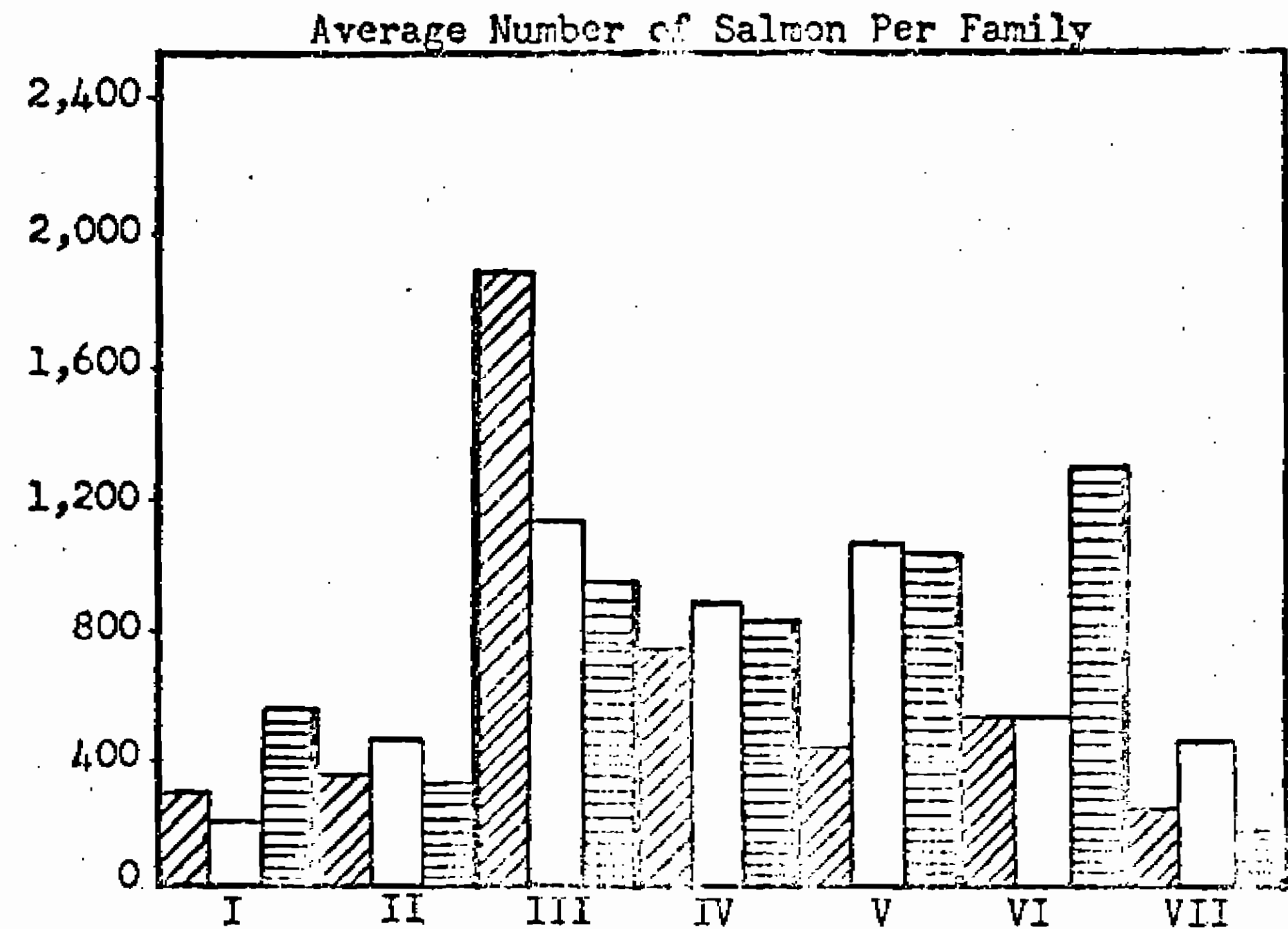
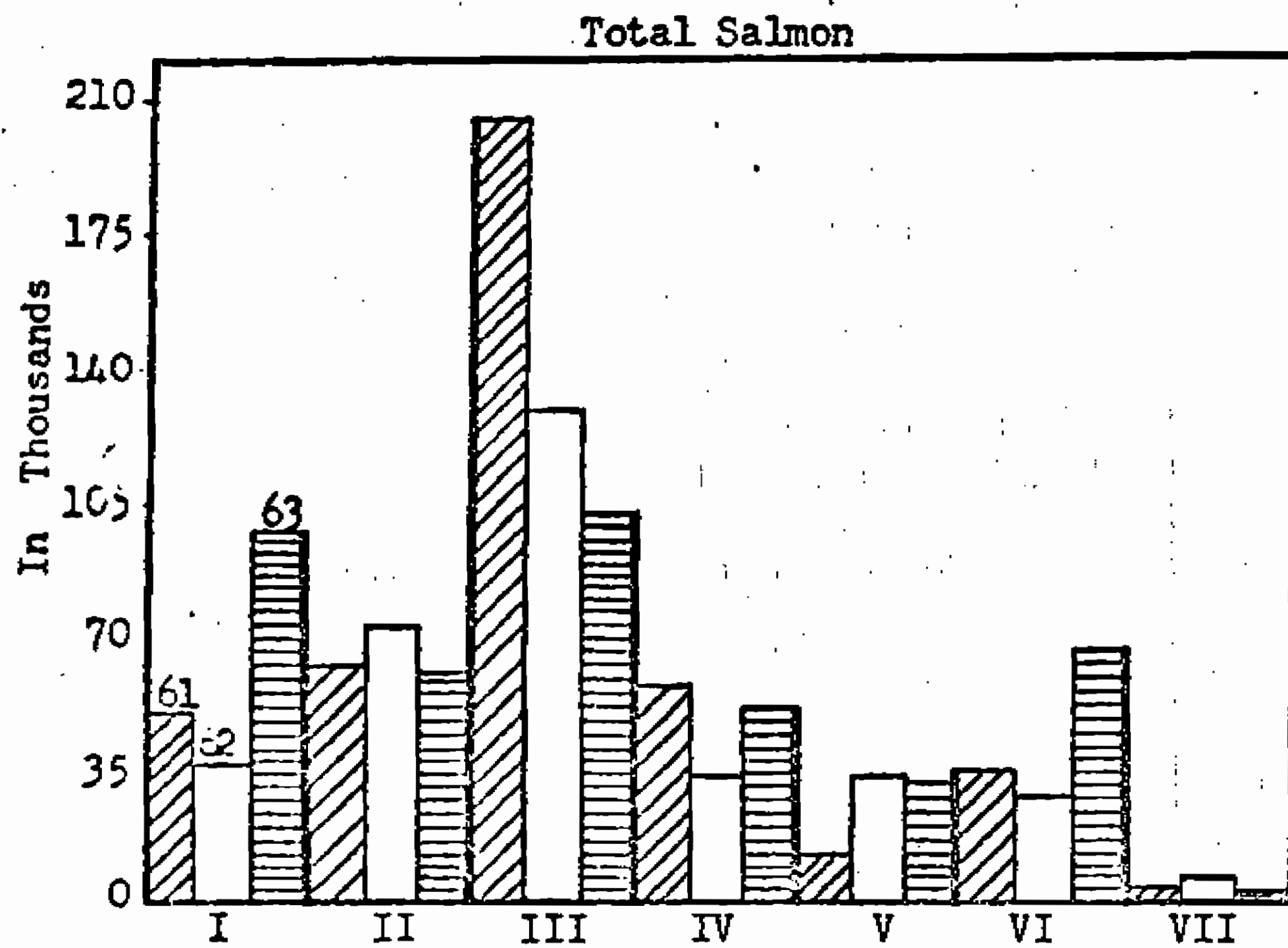
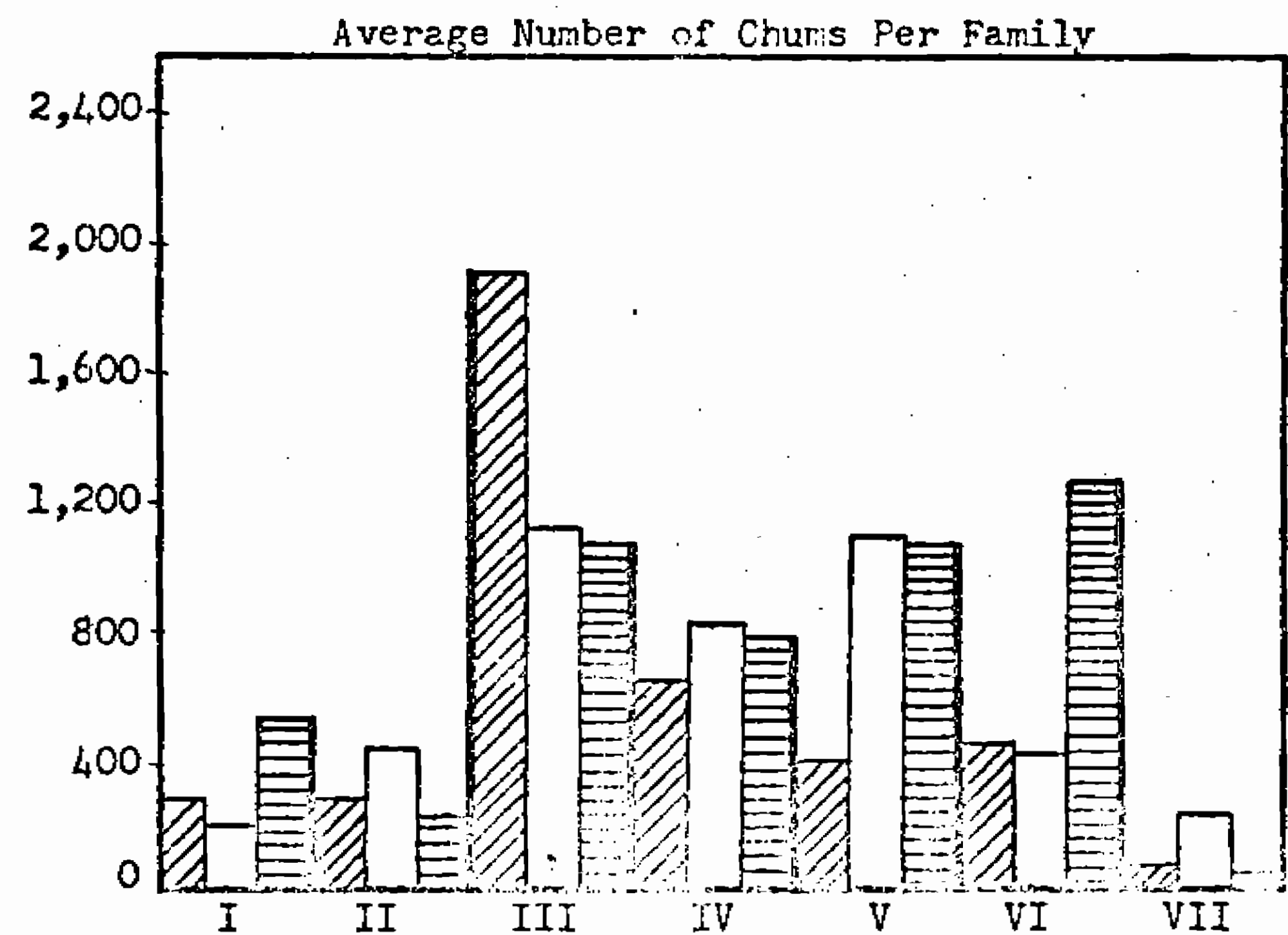
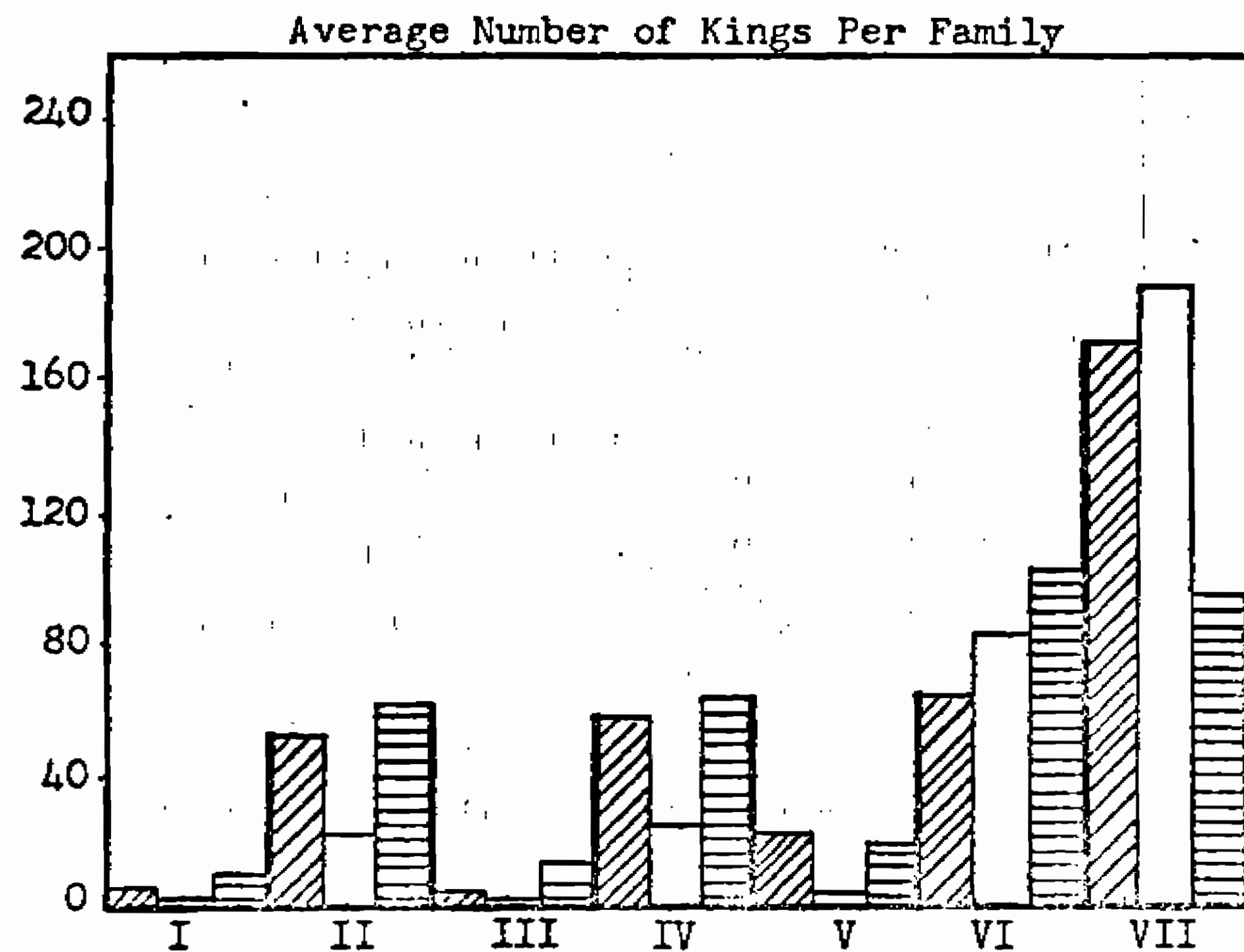


FIGURE 3 YUKON RIVER SUBSISTENCE CATCHES BY DISTRICT (EQUIVALENT AREAS), 1961 - 1963



There is reason to believe that fishermen in Districts I and II did just this after the closure of the commercial season. After this closure, there were still relatively large numbers of kings present in the river considering the lateness of the season.

Over most of the drainage, especially early in the season, very high water carrying large amounts of driftwood was reported. These conditions are thought to result in lowered catches. Although high water prevailed during most of the 1962 season, also, the conditions in 1963 were reported to be worse. Probably with more favorable water conditions, the king catch during 1963 would have been even greater.

On the basis of these comparative catches, the 1963 king run appeared to be similar, if not larger, than the 1961 run. Both of these runs are considered large in comparison to past years. The fact that king catches in Districts III to VI and in villages upstream from Dawson were all similar to or greater than 1961 and 1962 catches, indicates that escapements to these sections of the drainage were also greater and that no run or stock was seriously overharvested by the commercial fishery downriver.

The average chum salmon catches per fishing family surveyed in 1963 were greater than that of the previous two years in only Districts I and VI. Catches in the remaining districts were slightly less than 1962 with the exception of Districts II and VII. The average catches per fishing family in these two districts were the lowest since the subsistence survey was initiated.

Investigations of chum salmon during 1961 and 1962 revealed that villages below Koyukuk utilize mainly summer chums, while villages upstream mainly utilize fall chums. There are some villages in the vicinity of the mouth of the Yukon that do a considerable amount of fishing on the fall chum run. Likewise, the fishermen on the Tanana River also take large quantities of summer chums.

The summer chum run could be judged as a poor to average sized run on the basis of catch comparisons. The fishermen of District III, who utilize mainly summer chums, had a relatively poor fishing season. Again, the effect of high water and driftwood, which is thought to have a depressing effect on catches, may have hid the fact that this run was larger.

The number of king nets used for subsistence fishing greatly increased in District II over the number used in 1962 (80 to 156). This emphasis on king salmon further reduced the summer chum catch for this district.

Fishermen near the mouth reported the largest run of fall chums in recent years. This is evidenced in District I's increased 1963 catches; the survey crew reported that considerable amount of effort was being placed on this run during the time of their surveys.

The 1963 catches of District VI, mostly fall chums, were greatly increased over the catches of 1961 and 1962. This district was surveyed an average of 29 days later in 1963 than in 1961; survey dates are not known for this district in 1962 (surveyed by U. S. Fish and Wildlife Service). The increase in the catch may be partly due to the fact that the later survey in 1963 included a large portion of the fall chum catch not reported in 1961 and possibly in 1962.

The average catch per family, mostly fall chums, in District VII represented a decrease from 1961 and 1962. This decrease might be due largely to reporting errors concerning fishing effort (explained in the section regarding king salmon catches) and not due to actual run size. Mr. W. K. Elliott, Fishery Officer of the Canadian Department of Fisheries, reported in a personal communication that a large chum run was evident in some areas. He indicated that water conditions may have resulted in lowered catches for Dawson. Catches reported in villages located upstream from Dawson, not included in Table 15 and Figure 3, were 4,000 chums in 1963 and 3,500 chums in 1962.

It should be noted that the catches of Old Crow, a Canadian village on the Porcupine River, increased from 2,800 chums reported in 1962 to 20,000 chums reported in 1963. Fishing effort of this village for 1962 and 1963 is not known. Although increased fishing effort may have influenced catches, the data indicates a larger Porcupine River run in 1963 as compared to 1962.

#### RUN TIMING

As mentioned in the section on commercial fishing, in 1963 for the first time analysis of run timing and races in the various salmon runs has been attempted by several methods. The king run has been followed through the commercial and subsistence fishery by means of commercial catch statistics and subsistence catches recorded on catch calendars mailed to individuals prior to the fishing season. A tagging program was also carried out at Flat Island and Pilot Station to determine run timing and utilization in the king run. The results of this program will be available at a later date. Chum salmon run timing and racial analysis were based primarily on catch calendar returns, although the Pilot Station tagging results may contribute significantly to knowledge of these runs when they have been completely analyzed.

Chum Salmon: Figure 4 presents the average chum salmon catches for subsistence fishermen from several villages. The catch data was obtained from catch calendars and forms. A majority of the catches were taken by fishwheels.

The catches of Nenana, on the Tanana River, and Huslia, on the Koyukuk River are shown as dotted lines to distinguish them from main river catches. All mileages (Y axis, right margin) in this figure represent distances from Flat Island, located at the mouth of the south mouth of the Yukon River.

One of the most striking aspects of the figure is the differences in utilization of summer and fall chums. Fish of the runs in the lower Yukon area from early June to early July are considered summer chums; fish running later are



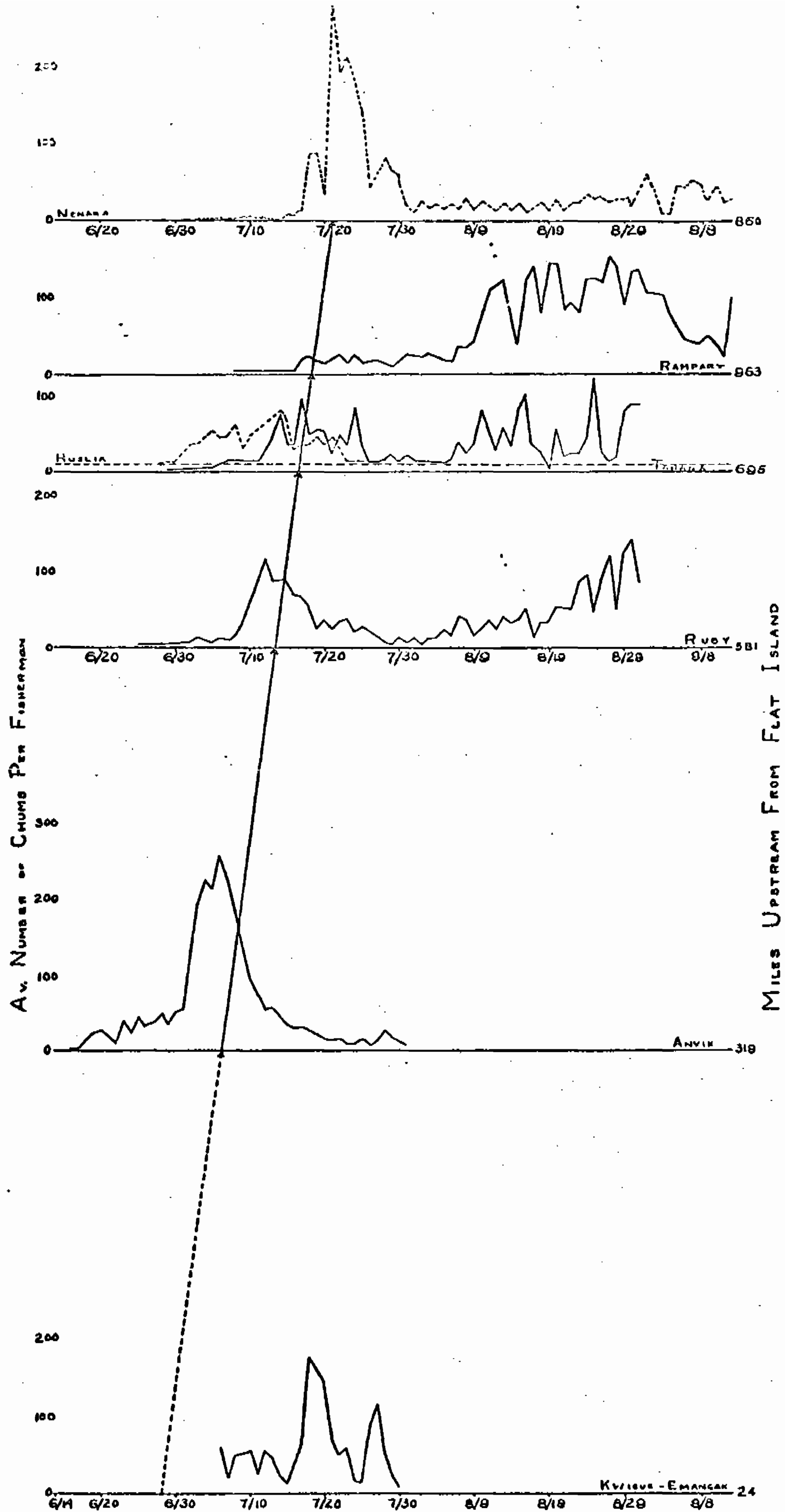


FIGURE 4. THE DISTRIBUTION OF CHUMS AT VARIOUS LOCATIONS, YUKON RIVER TRAIL.

considered fall chums.

Kwiguk-Emmonak catches were made after the commercial season closed and are mostly of fall run chums.

Anvik fishermen utilize summer chums almost exclusively. Although insufficient catch form data is available to illustrate catches for other villages, Anvik catches are considered characteristic of the area from Mountain Village to Koyukuk.

The fishermen of Ruby fish for and utilize both summer and fall chums. The Department has no catch records for September, although it is known that Ruby fishermen were still catching fall chums then.

Huslia fishermen utilized only summer chums. This is considered characteristic of other Koyukuk River villages as fall chums are not believed to enter this tributary. Peaks in the catches of Huslia are earlier than those of Tanana (both villages are located a similar number of miles from the mouth of the Yukon River). This may be due to the fact that salmon at Huslia were closer to their spawning grounds and were migrating at a faster rate of speed. Another possibility is that a Koyukuk run of chums entered the Yukon River in advance of a Tanana River run and was largely missed by downstream fishermen.

The catch of Nenana is likewise considered characteristic of other Tanana River fishing communities. The Tanana River receives both runs of chum salmon, and the 1963 Nenana catches indicate that summer chums made up most of the total catch.

The figure indicates that relatively few summer chums migrate past the mouth of the Tanana River. The catches of Rampart show this and are considered characteristic in this respect for the upper Yukon drainage. The catches of Fort Yukon (not shown in the figure) are very similar to those of Rampart.

Lines have been plotted forward from the X axis of Figure 4 connecting

peak catches which indicate that the summer chum run's rate of migration is in excess of 30 miles a day. Tagging and recovery data for 1961 and 1962 indicate a migration rate of approximately 20 miles a day. Salmon after being tagged often become temporarily disoriented, sometimes even moving a considerable distance downstream from the tagging site. Also, salmon when tagged may immediately resume upstream movement but at a slower rate due to the effects of the tagging operation.

There is not sufficient evidence to accurately fix an average migration rate for Yukon chums using this method of analysis. However, attention is called to the fact that migration rates as calculated from upstream recoveries of tagged salmon are probably low estimates.

King Salmon: Figure 5 shows catch per unit effort by date at various points along the main Yukon. The Flat Island data was derived from catches at the Department tagging site and is representative of the run as it entered the south mouth of the Yukon. 334-17 and 334-24 are statistical areas in the commercial fishery (see Figure 2 ), and their graphs represent commercial catches in those areas. The mid-point of 334-17 (48 miles upriver from Flat Island) is used and the area of greatest gear concentration (140 miles upriver) was used for 334-24. 334-17 was used because it is at the upper end of sub-district #1 and is the first point along the river that receives fish from all the separate mouths of the Yukon. 334-24 is at the upper end of sub-district #2 and provides a point of reference between 334-17 and Holy Cross. The arrows on each line show the estimated point in the run at which the major peak or peaks occurred. The catches for Holy Cross and upriver points were taken from subsistence catch calendars. All points are shown at their relative distance upriver from Flat Island.

The two major peaks discussed in the commercial fishery seem to generally hold true upriver. It was originally theorized that the two main peaks in the

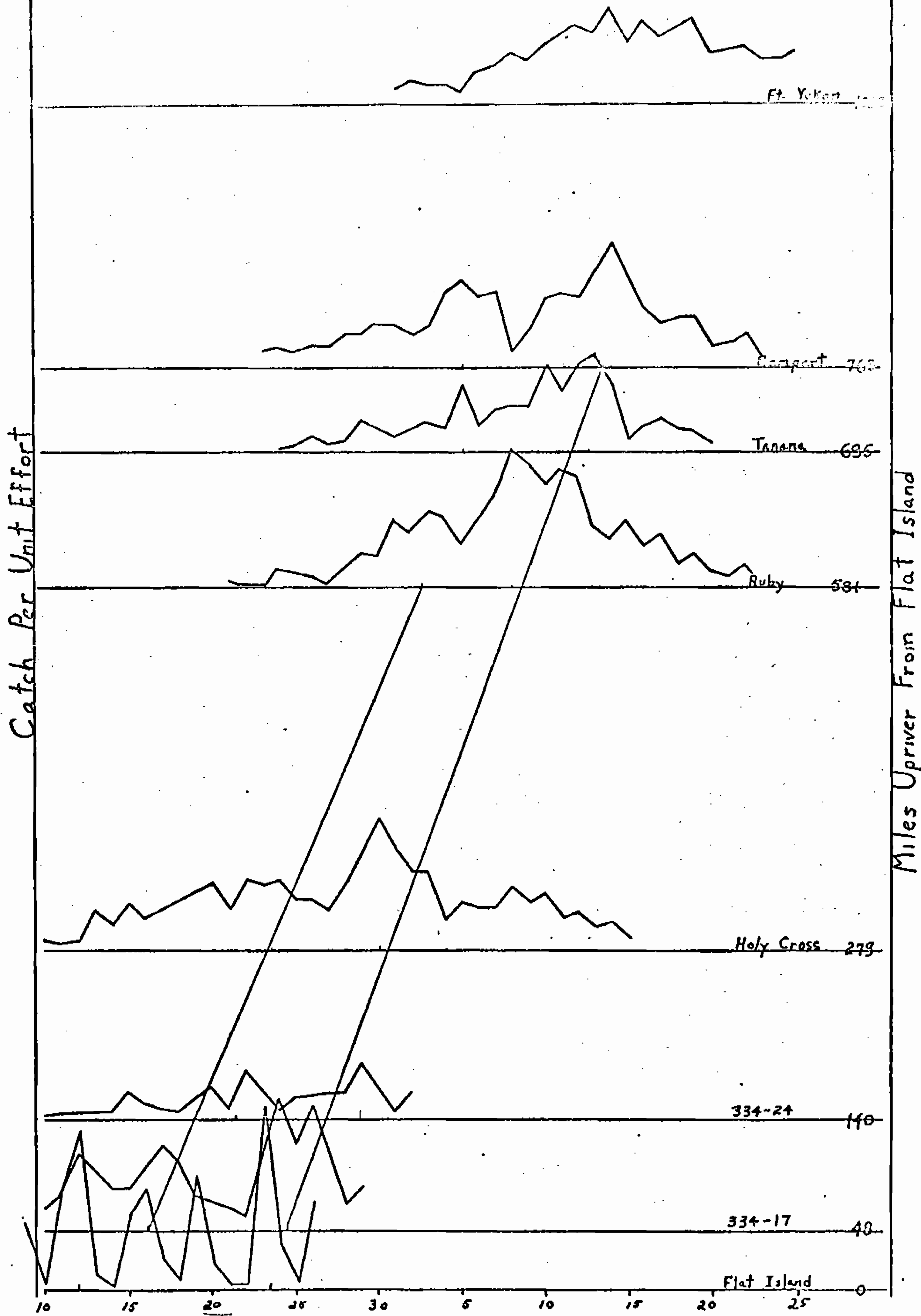


FIGURE 5 KING SALMON CATCHES AT VARIOUS POINTS, YUKON RIVER DRAINAGE

king salmon run at the mouth were the result of two separate main races in the run--one migrating to spawning grounds in the Tanana drainage and below, and the other migrating up the main Yukon past Rampart to spawning grounds on the Porcupine River and in Canada. If the data in Figure 5 is correct, this theory would appear to be invalid. The dual peak configuration is present not only at the mouth, but is still very distinct at Rampart, past the point where the Tanana branches off.

The first main peak in the run entered the south mouth on June 12. In an attempt to plot its progress upriver, a straight line has been generally fitted to the dates at which this peak occurred at each upriver point. 334-17 is taken as a definite point of reference for the occurrence of the two peaks. Not only is this the area at which all the mouths join, also its catch depicts two such definite peaks that there can be no confusion as to what date these peaks passed through.

As can be seen in Figure 5 , there is a fairly good fit between 334-17, Holy Cross, Ruby, and Tanana. The slope of this line indicates an average migration rate of about 31 miles per day. There are a few unexplained facts about this first peak. Why doesn't the peak in the south mouth (Flat Island) fit the line better? Is this because the fish mill after passing the gear at the mouth and into the main river current, and therefore exhibit a delay in reaching the next upriver area? Or is the lack of correlation a result of the major first peak not entering the south mouth in relationship to its actual magnitude, and therefore not exerting as great an influence on upriver catches as the run entering other mouths, as theorized in the commercial fishery analysis? Another unexplained point is the lateness of the peak in 334-24. Both peaks in this area are exactly the same number of days later than the first and second peak migration rate lines, so this could represent a changing migration rate as the



fish move upriver.

The third unsolved discrepancy is why the first peak in the run occurs so early in the catches at Rampart. The peak catches in the run do not fit the line at all. This is quite likely due to the fact that Tanana is the splitting point for kings bound for Canada or the Tanana River. Therefore, the peaks at Rampart could be the result of the first part of peaks at Tanana, the balance being bound for the Tanana River, and the peak catches at these two locations would not have to correspond.

The fit for the line describing the second peak is generally better. This line indicates an average migration rate of around 36 miles per day.

Fort Yukon's catches do not exhibit the definite dual peak evident in down-river points; however, two peaks can be generally seen on July 12 and 17. If these correspond to the peaks at Tanana on July 4 and July 10-12, it would mean a migration rate of 38 miles per day for the first peak and 44 miles per day for the second peak. Computing migration rates from the peaks at Rampart, a more believable figure is arrived at for the first peak, 30 miles per day, and a fantastic figure of 48 miles per day for the second peak. At any rate, it seems that the migration rate above Tanana increases greatly.

One point not shown which would give a definite migration check is the run over Whitehorse dam. This data has not been received, but in 1962, this run started on about August 2, definitely peaked on August 11 and tapered off after August 28. In 1959, the run started around July 30, peaked August 6-10 and again on August 13, tapering off after August 20. 1963's count should definitely be fitted into the run timing analysis, but for the present, perhaps some comparison can be drawn with past years.

Whitehorse is at Mile 1745, 1,754 miles upriver from Flat Island and 982 miles above Rampart, the farthest point upriver for which we have good run

timing data. (Fort Yukon's subsistence catches were not definite enough in character to use for peak timing.) Using August 9 for the first peak, a migration rate of 27 miles per day from Rampart can be computed. It is probable that this rate should be higher, so either these years are not comparable, or the fish are delayed at the fish facilities.

#### TAGGING PROJECTS

In 1963, two tagging sites were set up on the Yukon River. One, at Pilot Station, utilized fishwheels primarily for the capture of chum salmon. This project was a continuation of the work started during the crash program research on Yukon chum salmon. This project tagged fish throughout the summer months.

Kings are the backbone of the Yukon commercial fishery and yet practically nothing concrete is known about their run timing, differentiation of races in the run, population size, or percentage utilization in the commercial fishery. Fishwheels have proven to be inefficient devices for the capture of king salmon, so in 1963, it was decided to completely revise tagging techniques on the Yukon in an attempt to start accumulating the data on this species needed by management. A tagging site was set up at Flat Island (see Figure 2 ) in the south mouth of the Yukon River. This site is below nearly all of the commercial fishery. Kings were captured with a set gill net with a mesh size of 8 1/2" stretched measure. The initial effort was very successful and the method and location look promising. King salmon catches are shown in Table 16.

Data from both of these projects is in the process of being card punched and analyzed on a computer. The results of this analysis will be presented later as an addenda to this report.

TABLE 46

KING SALMON CATCH, FLAT ISLAND TAGGING SITE  
YUKON RIVER, 1963

Date	Kings Tagged	Kings Killed	Total Catch
June 8	10	1	11
9	34	7	41
10	6	0	6
11	60	4	64
12	87	8	95
13	10	0	10
14	2	0	2
15	42	2	44
16	55	6	61
17	17	1	18
18	6	1	7
19	59	9	68
20	11	5	16
21	2	0	2
22	4	0	4
23	14	95	109
24	23	2	25
25	2	1	3
26	<u>18</u>	<u>33</u>	<u>51</u>
TOTALS:	462	175	637

AGE AND SEX COMPOSITION

Table 17 presents the age composition of 176 kings sampled in the commercial catch at Flat Island from June 8-23. The great preponderance of six year old fish in the catch should be noted.

ESCAPEMENT SUMMARY

Very few direct indices of escapement are available. Many of the streams were high and muddy throughout the season, due to rain, precluding most surveys of spawning tributaries. At any rate, funds were not available for a detailed series of surveys. A few surveys by other agencies are available.

Kings: The U. S. Fish and Wildlife Service, Branch River Basins surveyed the Chena and Salcha Rivers of the Tanana River. The Salcha, the usual index stream for the Tanana, was high and muddy, and the first survey was made on August 23-24--too late for king salmon. The Chena River survey is compared with past years below.

<u>Date</u>	<u>Kings</u>	<u>Chums</u>
July 14, 1954	232	-
July 31, 1960	135	-
August 8-10, 1962	61	147
August 24-26, 1962	2	402
July 25-26, 1963	137	5
August 31 - September 5, 1963	52	898

As can be seen, the escapement to the Chena looks as good as in past years.

The only other check on escapement are the counts over Whitehorse Dam and a general survey of spawning tributaries in Canada by W. K. Elliott of the Canadian

TABLE 17

AGE DETERMINATION, KING SALMON  
FLAT ISLAND, 1963

Age Classification	5 <sub>2</sub>	5 <sub>3</sub>	6 <sub>2</sub>	6 <sub>3</sub>	7 <sub>2</sub>	7 <sub>3</sub>
Males	21	0	61	-	2	4
Percent	23.86	-	69.31	-	2.27	4.55
Average Snout Length	83.75	-	92.09	-	98.0	100.50
Females	15	-	69	1	2	2
Percent	16.85	-	77.52	1.12	2.24	2.24
Average Snout Length	84.13	-	90.44	83	96.0	96.50
Combined Sexes	36	-	130	1	4	6
Percent	20.40	-	73.86	.06	2.27	3.40
Average Snouth Length	83.94	-	91.26	83.0	97.0	98.50

Total Number Females - 89

Total Number Males - 88



Department of Fisheries. Counts for the past five years are shown below.

<u>Year</u>	<u>Kings</u>
1959	1,054
1960	648
1961	1,068
1962	1,500 (Est.)
1963	483

A general survey of the tributaries yielded an estimate of 1/3 the number of kings as in the past two years. However, subsistence catches above Dawson in the various tributaries were quite good and the fishermen thought the run was good. The low count over the dam may be a partially a result of the original construction which took place in 1957 and 1958. Only temporary fish passage facilities were used in 1958 and their success is not evaluated in any report available to us.

Generally, commercial and subsistence catch statistics indicated a king run equal to or larger than that of 1961 with a better escapement. However, this picture is confused when the limited spawning surveys are compared. The escapement to some areas (i.e. Whitehorse Dam) seems to have been low, and to others (i.e. Chena River) seems good to average. Obviously this points out the need for a systematic, annual survey of Yukon spawning tributaries.